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CLAIMS

1. A Ca-Mm-Ni based alloy of the AB₅ type, said alloy being of the formula:



- where M is selected from the group consisting of: any mischmetal, any rare earth metal, and an homogeneous or an inhomogeneous combination of any of: (i) at least two mischmetals, (ii) at least two rare earth metals, and (iii) at least one mischmetal and at least one rare earth metal.

T is selected from the group consisting of: metalloids, and an homogeneous or an inhomogeneous combination of at least two metalloids;

- 15 $0 < x \leq 1$;

$0 < y \leq 0.5$; and

$0.8 \leq t \leq 1.2$.

2. The alloy of claim 1, wherein, in the formula I:

$0.4 \leq x \leq 1$;

- 20 $0 < y \leq 0.3$; and

$0.85 \leq t \leq 1.2$

3. The alloy of claim 1 or 2, wherein:

M is a mischmetal; and

T is any of Si, Ge and Ga.

- 25 4. The alloy of claim 1 or 2, wherein:

M is a mischmetal, and the metalloid of T is any of Si, Ge, and Ga.

5. Use of the alloy of claim 1, 2, 3 or 4 for storing hydrogen.

- 5 6. A method of preparation of an alloy of being of this formula:



where M is selected from the group consisting of: any mischmetal, any rare earth metal, and an homogeneous or an inhomogeneous combination of any of: (i) at least two mischmetals, (ii) at least two rare earth metals, and (iii) at least one mischmetal and at least one rare earth metal.

T is selected from the group consisting of: metalloids, and an homogeneous or an inhomogeneous combination of at least two metalloids;

$$0 < x \leq 1;$$

$$0 < y \leq 0.5; \text{ and}$$

$$15 \quad 0.8 \leq t \leq 1.2.$$

comprising the steps of:

- a) preparing a powder by milling a mixture of elemental powders and/or pre-alloyed substances of the elemental ingredients of the alloy to be prepared in adequate proportions to obtain the required alloy; and
- b) annealing and/or sintering the so prepared powder at elevated temperatures in a crucible for a short period of time in an inert or reactive atmosphere.

7. The process of claim 6, wherein the milling in step (a) consists of a ball milling or mechanical alloying.

8. The process of claim 7, wherein the milling in step (a) is carried out in the presence of at least one anti-sticking agent.

9. The process of any one of claims 6 to 8, wherein the annealing and/or sintering in step (b) is carried out at a temperature higher than 600°C but not higher than 1100°C in a steel crucible.